

# AUTOMATED HYDROPONICS MONITORING SYSTEM USING IOT

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## **Keywords:**

Automation control, monitoring, Internet of things, mobile application, and Hydroponics.

## **Introduction**

The word "Hydroponic" defines as a means to grow plants via a medium that does not include the use of soil but involves inorganic nutrients or nutrient solution. Gericke who presented methods of growing plants in liquid media (nutrient solution) and introduced the term Hydroponics. Besides Gericke, many attempts were made to adopt the methods of soilless growing plants during thirties. However, technological progress was too inadequate due to insufficient knowledge about the nutrients and high cost involved in the process. Despite of all, countries like USA and others were keen to adopt this technology so that growing plants indoors without the favorable soil required as well as controlling the nutrient is possible.

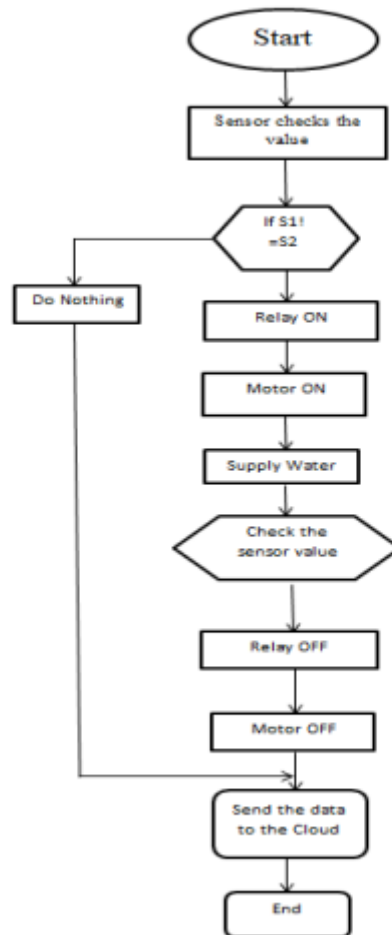
Hydroponics has long been accepted in foreign countries and it is cultivated as a commercial product, such as the United States, Netherlands and Japan. In Thailand, it is more popular and focuses on expensive vegetables because the cost of growing plant is quite high. However, vegetables, cultivated with hydroponics system, are short term of harvest and can often be rounded up to reduce costs.

## **Objective**

- (a) Automatically monitor and maintain pH and temperature of nutrient solution.
- (b) Create a fully automated system
- (c) Employing a greenhouse provides natural lighting while controlling the climate.
- (d) Plants are given as much nutrients and water as they can absorb
- (e) The main objective of hydroponics is to supply the ideal nutrient environment for the optimum plant performance
- (f) Development of hydroponics to monitor air temperature, root temperature, humidity, pH etc.

- (g) Automation drives productivity in hydroponic grow, and wireless connectivity is what enables automation, giving the grower the ability to set schedules.

## Methodology



pH sensor checks the pH value of the plant whether the nutrient solution is required or not. We need to give the threshold value. If the threshold value is not equal, automatically relay will ON. If relay ON means automatically the motor will ON and the nutrient solution will supply for the plants. After the sufficient amount of nutrient solution for the plants, again the pH sensor's check pH value. If the threshold value is equal, means the relay will turned OFF automatically the motor will get turned OFF then supply of nutrient solution for plants will stop.

We can check how much amount of nutrient solution supplied for the plants from the nutrient tank because the data will upload for cloud using Thing Speak.

## Result and conclusion



Figure 2: Hydroponics setup

The design phase is primary phase which gives brief idea about the automation for developing hydroponics technique with the help of IOT platform. The Thing Speak IOT platform used in this project is a free and open-source platform, which is very simple and user friendly.

The most important part in this project is execution phase. We have implemented DFT technique of hydroponics for growing different types of plants. All the sensor values are automatically monitored.

### **Scope for future work**

Many improvements can be done in future such as solar panel can be used to power up the automated controller which opens up wide range of opportunity to implement automated systems in places, where in electricity is not regular. In NFT, Drip irrigation technique can be used to provide the nutrients directly to the roots of the plants with drip pipes instead of passing nutrients solution in larger pipes. Thus we hope in future this technique is installed in larger fields of India and help the farmers get larger yields and larger income indirectly a better way of living.